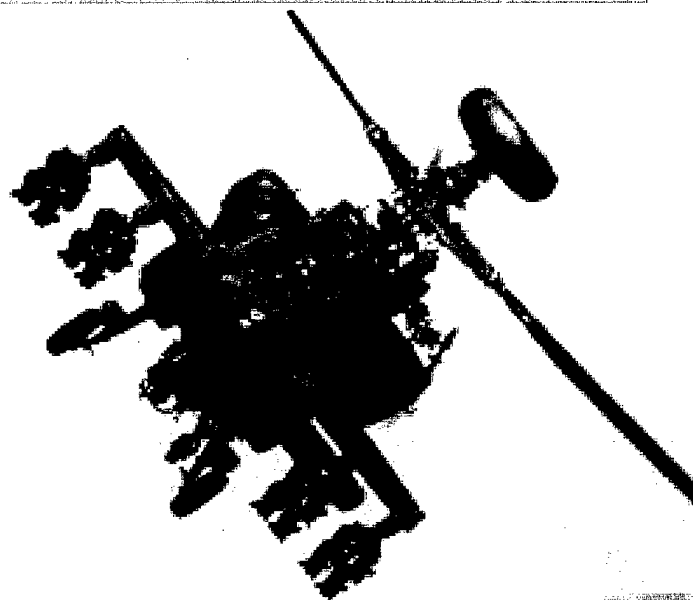


Vulnerability Reduction in Army Aviation

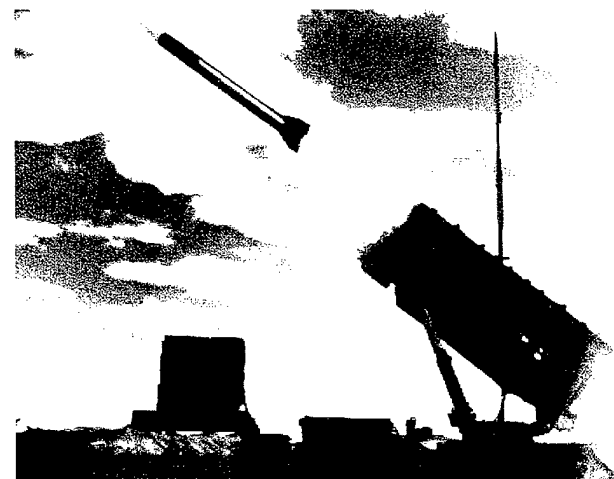
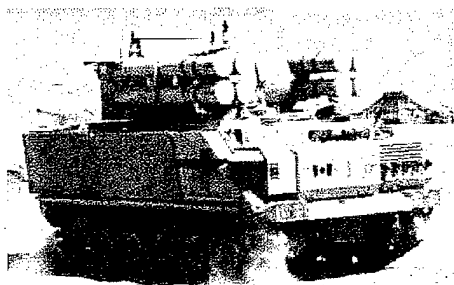
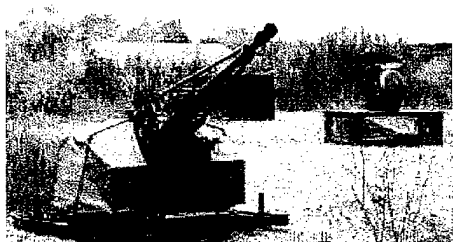


**Brigadier General Burke
Deputy Commanding General
United States Army Aviation Center
21 Oct 97**

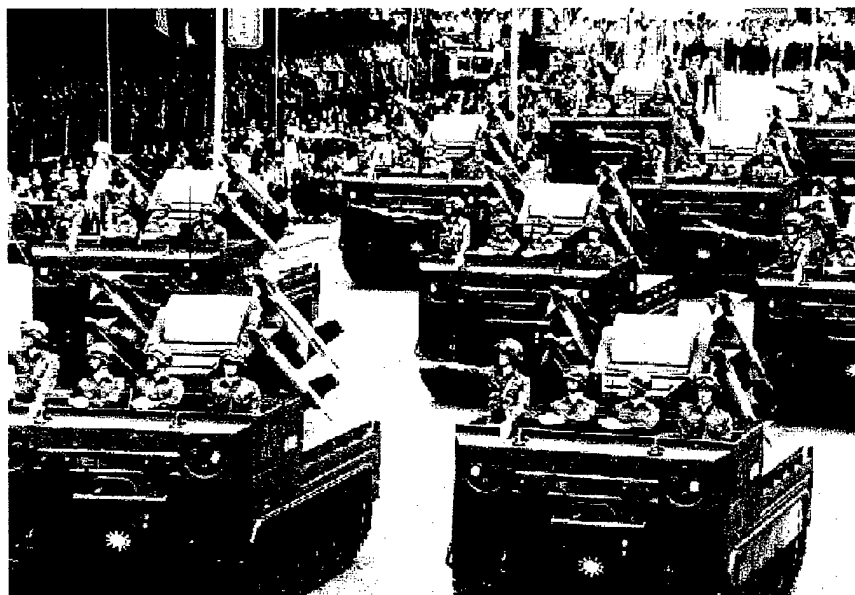
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Radar Directed Threats



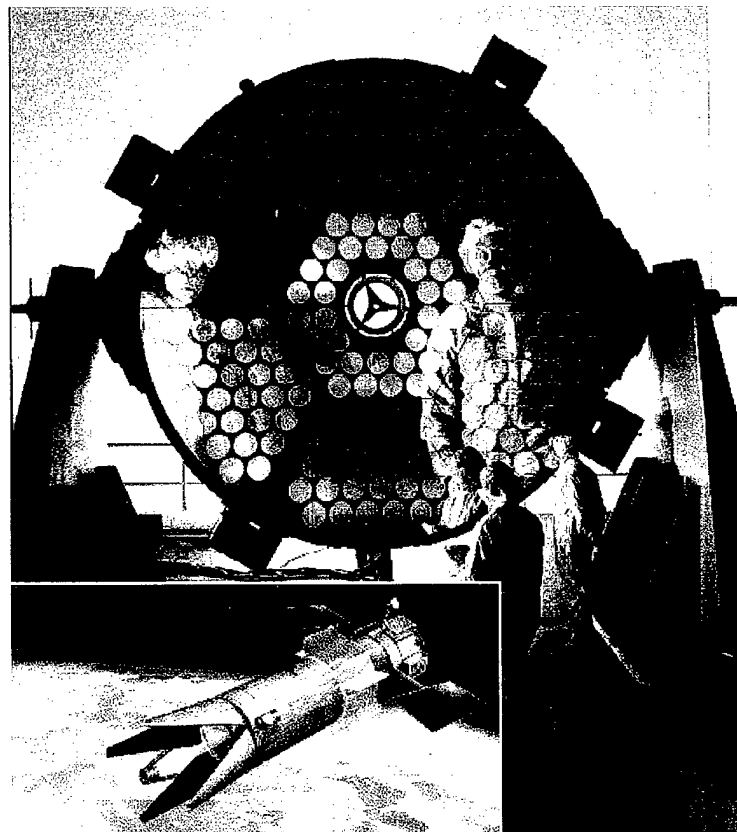
Infrared Threats



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Directed Energy Threats



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We Train Crews to Operate in Varied Environments

- **Multiship**

- **Low Level**

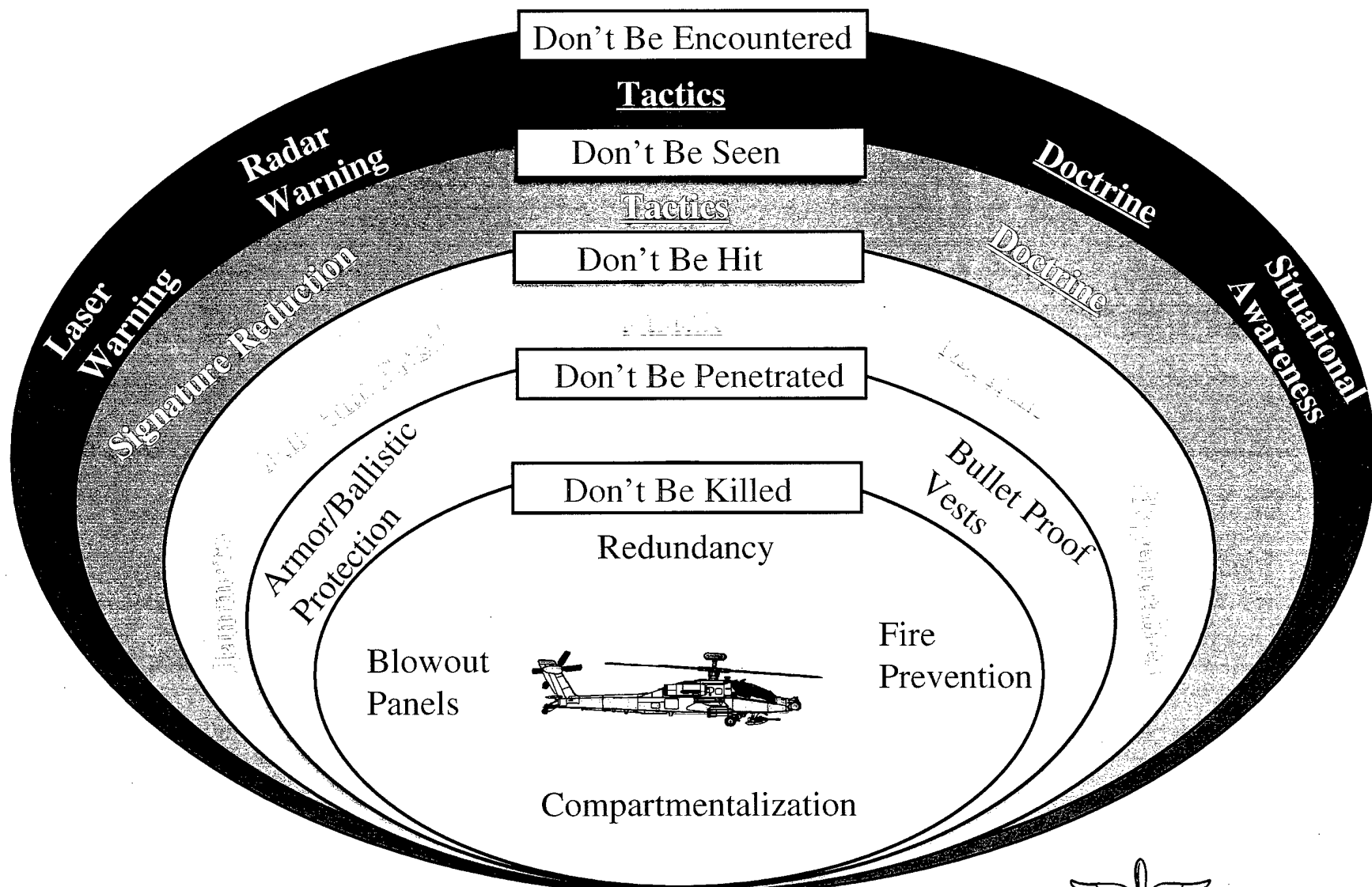


- **In Low Visibility/At Night**

- **In the Face of the Enemy**



Chain of Survivability



Don't Be Encountered

- **Force Protection**
- **Counter Reconnaissance**
- **Security**
- **Situation Awareness**
- **Laser and Radar Warning**



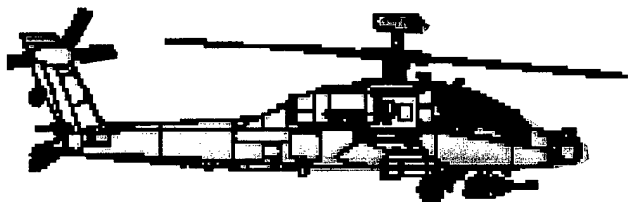
Don't Be Seen

- **Mission Planning**
- **Shared Situation Awareness**
- **Extended Range Multi-Spectral Sensors**
- **Fire and Forget Missiles**
- **Low Observable Technology**
- **Tactics, Techniques and Procedures**
- **Night/Adverse Weather Capability**



Don't Be Hit

- **Aided Targeting**
- **Extended Range Point Munitions**
- **Integrated ASE, Tactics Expert Functions**
- **Reduced Signatures**
- **Fire and Forget Weapons**
- **Tactics, Techniques and Procedures**
- **Maneuverability and Agility**
- **Jammers**



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Don't Be Penetrated

- **Hardening (Ballistic, EO, Directed Energy, Nuclear, Biological, Chemical)**
- **Tactics, Techniques and Procedures**
- **Onboard Diagnostics**
- **Self Sealing/Nitrogen Inerting Fuel Cells**

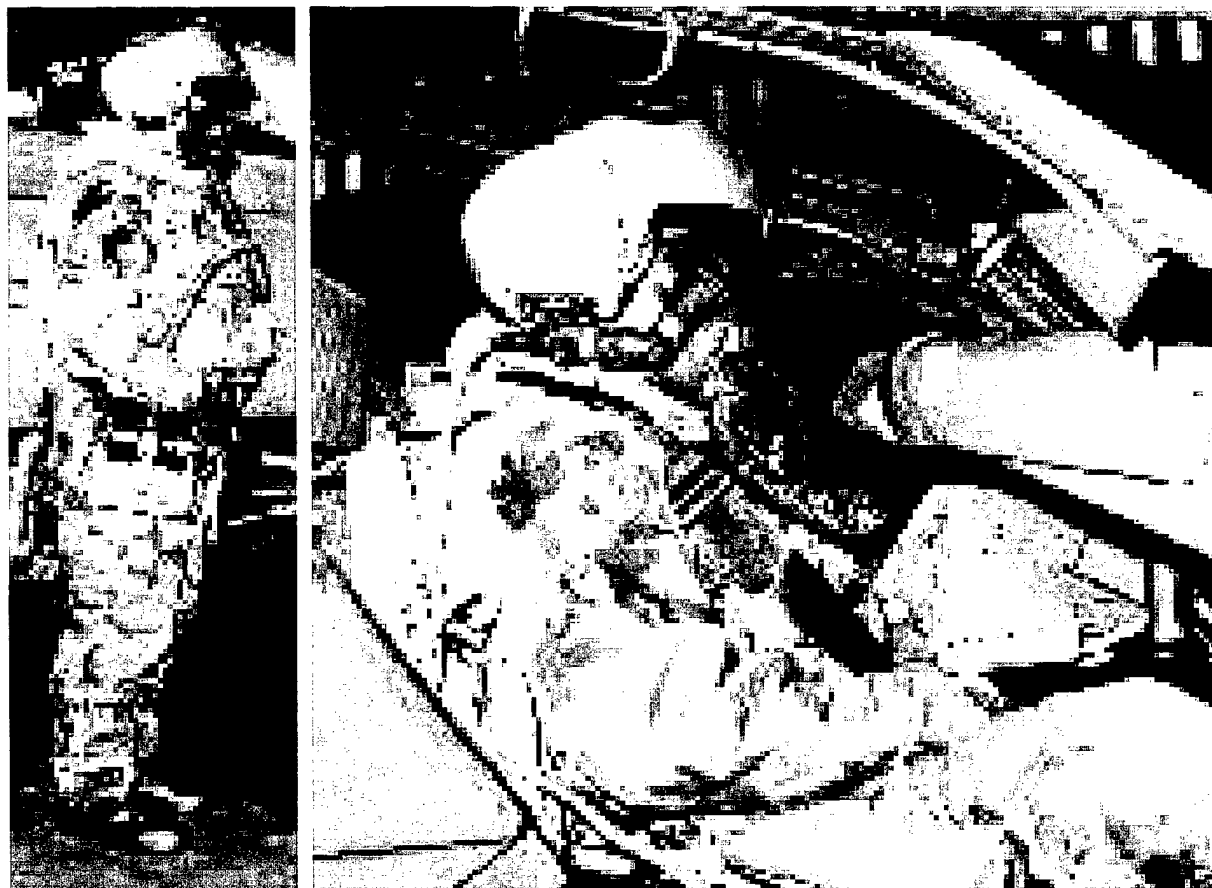


Don't Be Killed

- **Redundant Systems**
- **Vertical Crash Impact Protection**
- **Fire Retarding System**
- **Autorotation/Survivable Landing Capability**
- **Air Bags, Crew Retention Systems**
- **Crew Survival Vests/Radios**
- **Crew Extraction Capability**
- **Survivable Cockpit**
- **Blow Out Panels**



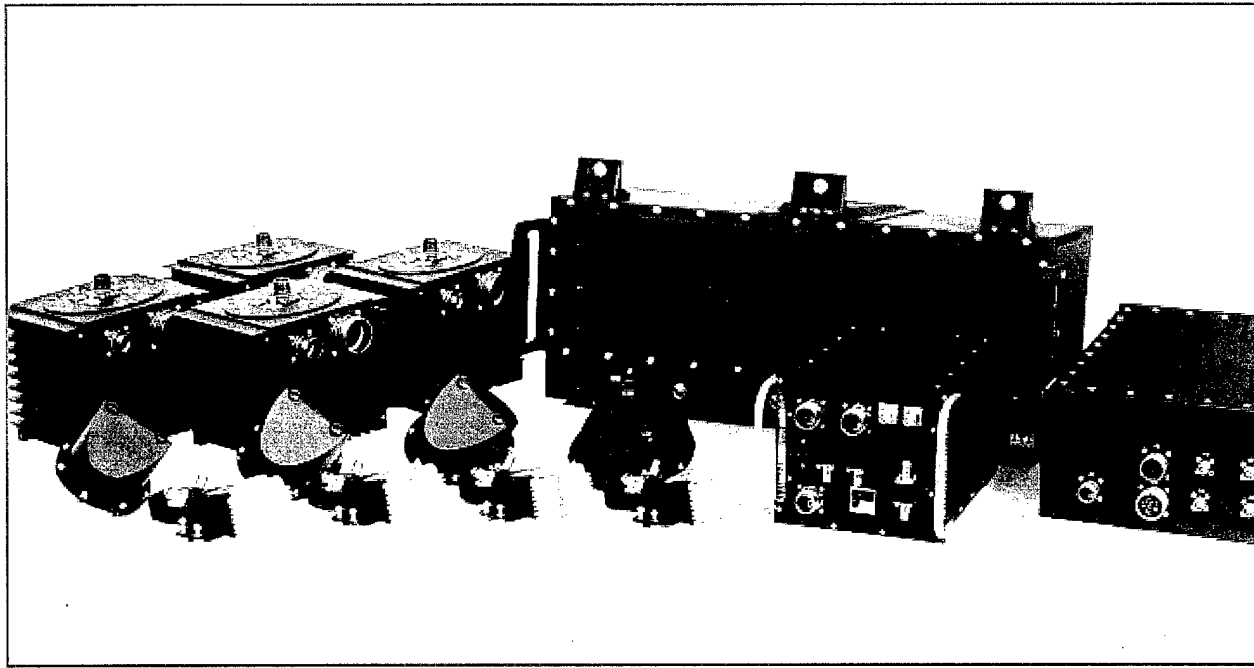
Air Warrior Equipment



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Suite of Integrated Radio Frequency Countermeasures



AN/ALQ -211

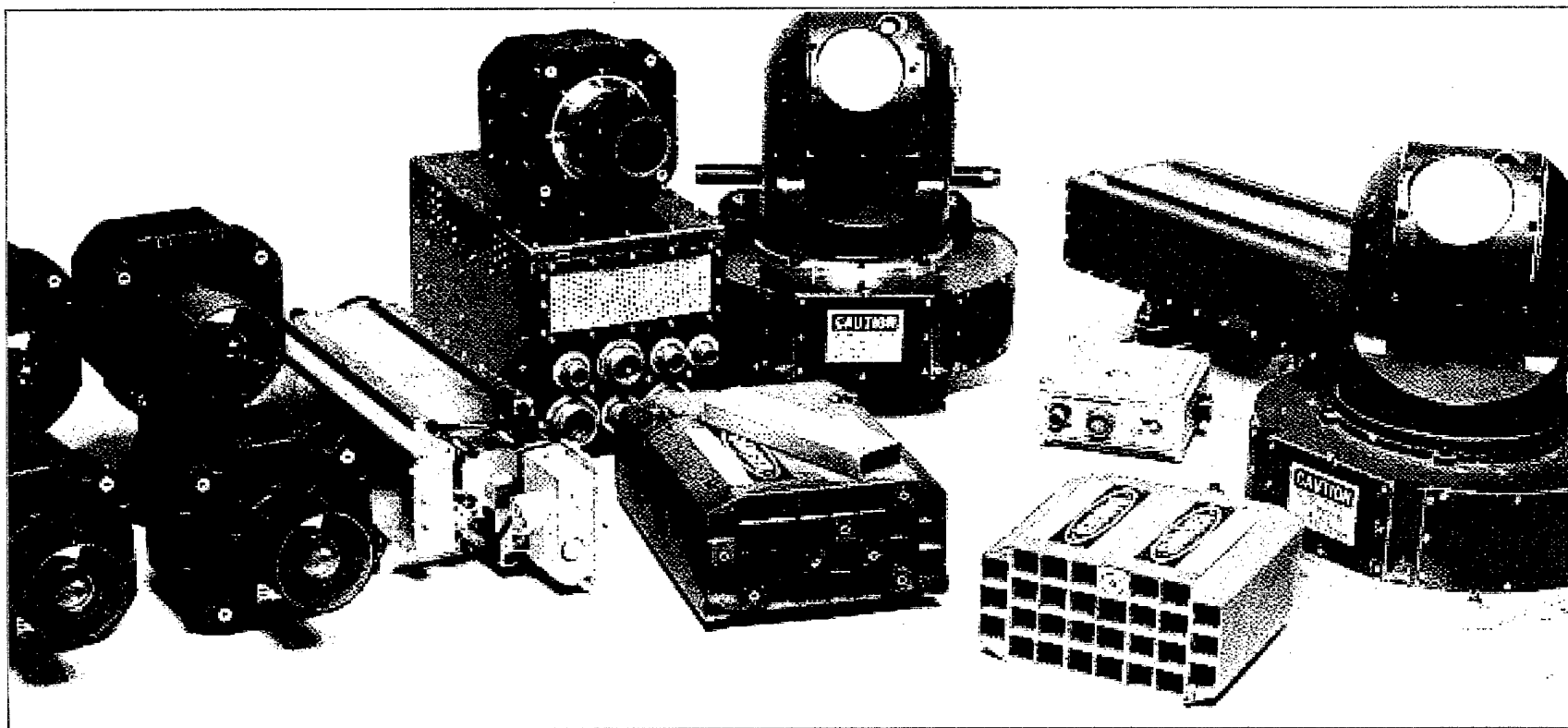
Suite of Integrated Radio Frequency Countermeasures

**AN/AVR-2A
Laser Warning**



Suite of Integrated Infrared Countermeasures

AN/ALQ-212

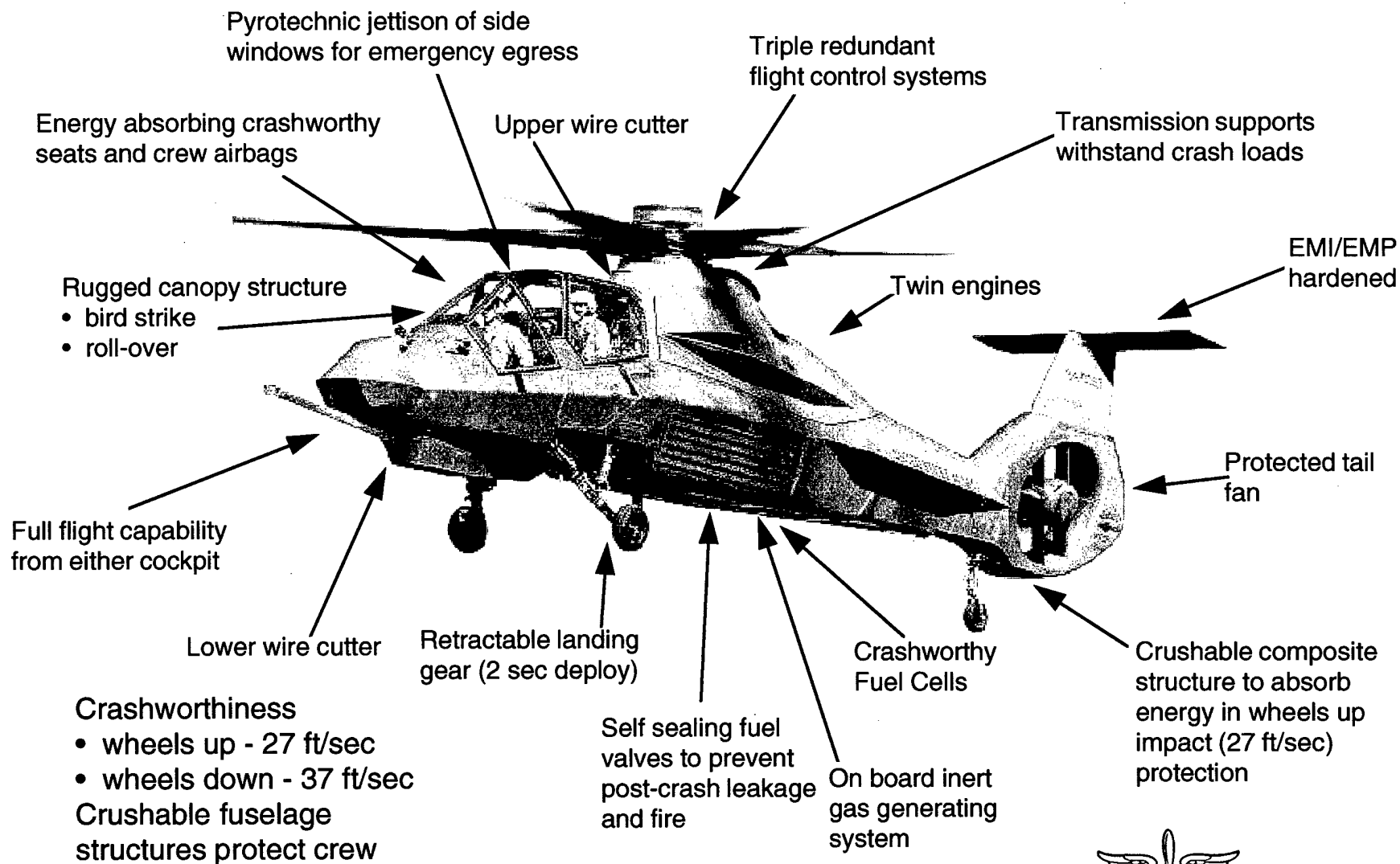


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RAH-66 Comanche

Vulnerability Reduction



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Comanche Detectability Comparison (Radar)

Radar Detectability

- Front Sector



295 Times Smaller!

35 Times Smaller!

THAN

THAN



Comanche/ Detectability Comparison (Acoustic)

Acoustic

- Front Sector
- Moderate Ambient



THAN

6 Times Quieter!

1.8 Times Quieter!

THAN



Comanche/ Detectability Comparison (Infrared)

Infrared

- Side sector
- Source signature
- No solar load
- Stinger



3.9 Times Cooler!

1.9 Times Cooler!

THAN

THAN



Comanche/ Detectability Comparison (Visual)

Visual

- Front Sector
- Unaided eye
- Terrain Background
- Sector search

119



1.2 Times Smaller!

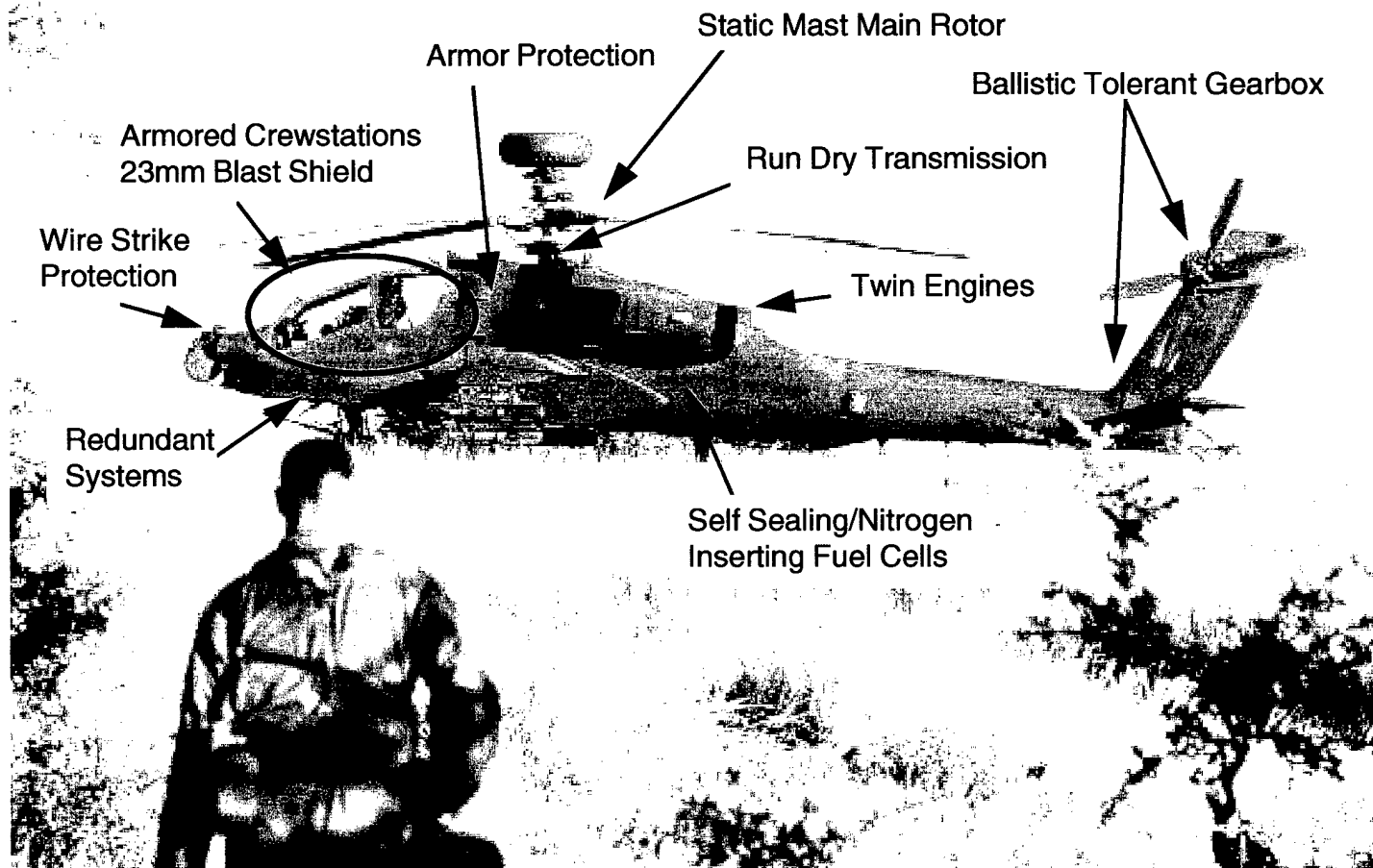
0.9 Times Smaller!



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AH-64D Longbow Hardening



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Summary

Chain of Survivability

- **Avoid Detection**
- **Avoid Acquisition**
- **Avoid Damage**
- **Avoid Being Hit**
- **Protect the Crew**



*"GENERALLY, IN BATTLE,
USE THE NORMAL FORCE TO
ENGAGE. USE THE
EXTRAORDINARY TO WIN."*

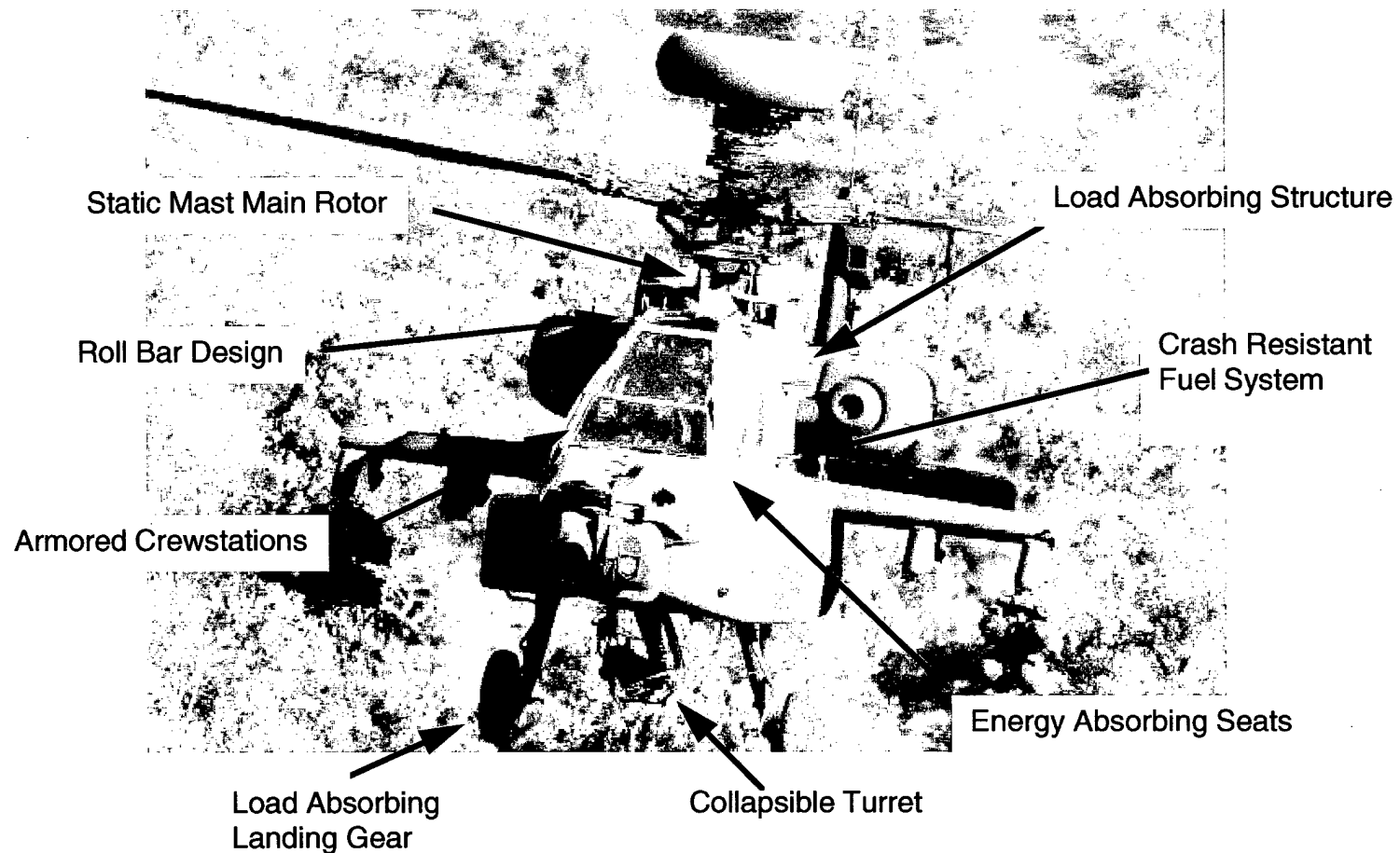
SUN TZU

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BACK-UPS

AH-64D Crashworthiness



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Tactics, Techniques and Procedures

Terrain flight
Standoff
Night fighting
Digital communications for target handover
Rapid target acquisition and prioritization
Fire-and-forget



Fire Control Radar

- Adverse weather/obscurants
- Automatic multitarget:
 - Detection
 - Classification
 - Prioritization
- Terrain profiling
- Air targeting
- Moving and stationary targets

AGM-114L Longbow Hellfire Missile

- Fire-and forget
- Adverse weather/obscurants

